

**Welcome to
The Second meeting of the
NGNGV Program's Vehicle Working Group**



Sponsored by DOE/NREL
November 7&8, 2000
Dallas, TX



Thanks!

This meeting has been organized by:

- Paul Norton, NREL
- Denny Stephens, Battelle
- Elizabeth Dolan, BusPlan
- Jennifer Elling, NREL
- Cricket Pierce, NREL



Next NGNGV Meeting

March 12

Los Angeles

Exact location TBD



Meeting Objectives

- Recommend the technologies that will be included in the Round 1 research RFP
- Get your input on the Communications and Outreach Plans



Shifting Gears....

NGNGV Meeting #1:

Get your input!

NGNGV Meeting #2:

Make some decisions!!



Meeting Agenda

Outreach and Communications Plan

Jen Elling and
Denny Stephens

Summary and Next Steps for NGNGV

Paul Norton

Discussion of new directions for the Vehicle Working Group
All

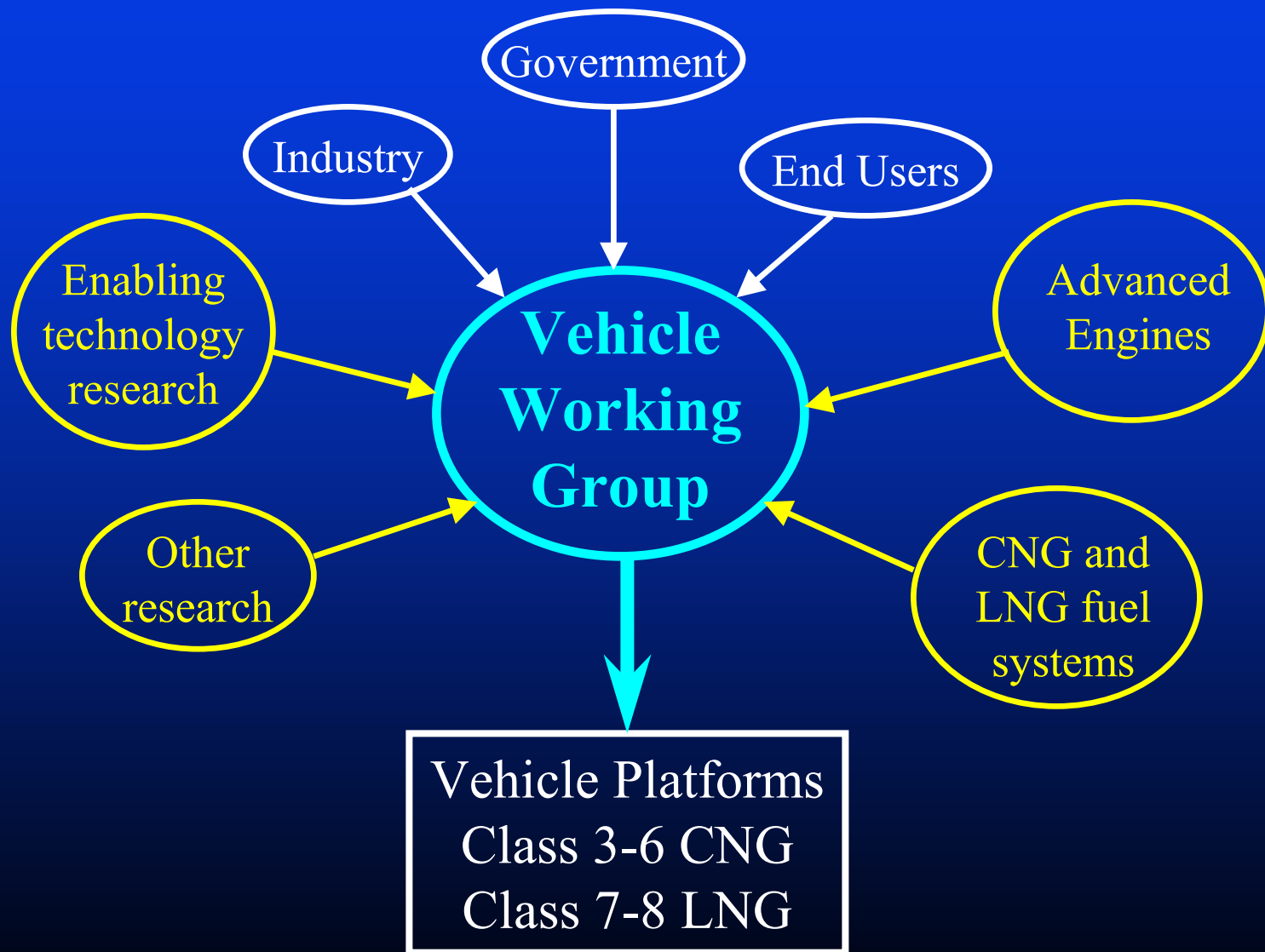



Program Objectives

**One medium-duty (Class 3-6) CNG vehicle and
one heavy-duty (Class 7-8) LNG vehicle
will be available in 2004 that:**

- ✱ Implement advanced DOE natural gas and heavy-vehicle technologies
- ✱ Implement high efficiency engine technology
- ✱ Implement step change in technology over current NG vehicles
- ✱ Have exhaust emission levels below proposed emission standards for 2007
- ✱ Are fully competitive with diesel vehicle counterparts in terms of performance and life-cycle economics
- ✱ **Are commercially viable**

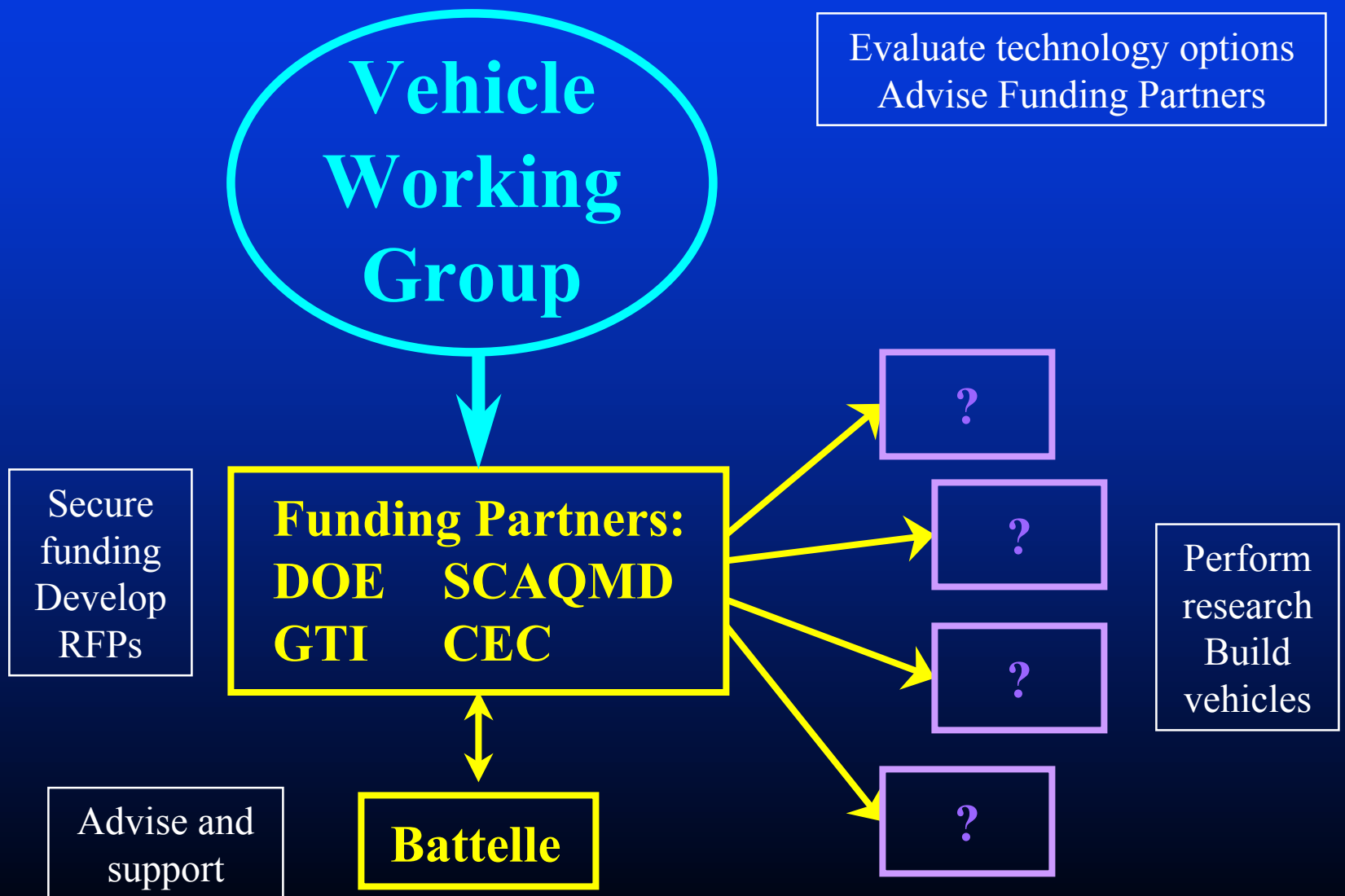
Program Integration





**This Vehicle Working Group
is the advisory body of the
NGNGV Program!**

NGNGV Program Structure





Two Round of Research

Round 1
FY2001
Enabling
Technologies

Round 2
FY2002
Prototype
Vehicles

Two Round of Research

Round 1
FY2001
Enabling
Technology

Round 1

technology R&D that...

- is close to completion
- could be completed with a relatively short, focused research effort
- could be made commercially viable in the 2004 time frame
- overcomes current barriers to natural gas vehicle introduction

Two Round of Research

Round 2

Development of two prototype vehicles to be put in service on on-road development in 2004.

- Class 3-6 CNG Vehicle
- Class 7-8 LNG Vehicle

Round 2
2002
Prototype
Vehicles

Program Timeline

Year 2000

- ✓ Launch Program
- ✓ Form Working Group
- ✓ Gather recommendations
- Secure 2001 Funding

✓ DOE

✓ GTI



□ SCAQMD



□ CEC



□ CARB

In the works!



Program Timeline

Year 2001

- Release Round 1 RFP
- Initiate Round 1 Research
- Gather Round 2 Recommendations
- Continue discussions with potential customers
- Secure 2002 Funding



Program Timeline

Year 2002

- Prepare Specifications for Vehicles
- Release Round 2 RFP
- Initiate and monitor vehicle design and build contracts
- Continue discussions with potential customers
- Secure 2003 Funding



Program Timeline

Year 2003

- Continue vehicle design and build contracts
- Identify sites for prototypes and coordinate infrastructure
- Prepare prototype testing and evaluation plan
- Continue discussions with potential customers
- Secure 2004 Funding



Program Timeline

Year 2004

- Produce production intent prototype vehicles
- Place prototypes in revenue service for further development and evaluation
- Commercial products in 2005
- Facilitate customer/supplier interactions

The NGNGV Program





Interim Vehicles

The NGNGV Program will produce quality integrated truck prototypes in 2004, what about the needs of fleets for natural gas trucks between now and 2004?



VWG Recommendations

Vehicle types we should develop:

Medium Duty: Package Delivery Truck

Heavy Duty: Refuse Truck or
City/Regional Delivery Truck

Package Delivery Trucks

Freightliner Custom Chassis MT-45 Delivery Van with Cummins B5.9 engine.



Freightliner Custom Chassis Corporation

CNG Delivery Van Chassis **MT45-Series**

Freightliner Custom Chassis Corporation with a proven track record in commercial vehicle manufacturing, is proud to announce the introduction of the new CNG delivery van chassis. This chassis is designed to meet the needs of the commercial delivery market. The MT45-Series CNG delivery van chassis is a proven, reliable, and efficient platform for your next delivery van.

MT45-Series CNG Delivery Van Chassis

- Cummins B5.9C natural gas engine
- Customized CNG design including "lean burn" technology
- Fueling system from the industry's leading supplier
- Steel body built with high-strength steel
- Fuel system meets or exceeds EPA CNG guidelines
- CNG engine system components
- B5.9C engine meets EPA 100 and 1000 HPD with catalytic converter
- Proven drive shafts and rear axle assembly
- End frame with steel floor plates and emergency exit door
- 10T transmission
- 10,000 lbs. GVW (10,000 lbs. GVW)
- 5-year/100,000-mile warranty

Package Delivery Trucks

Boyertown Manufacturing Step Van
is a medium-duty delivery truck available with a
CNG drive system.
(CalStart Website)



Package Delivery Trucks

Omnitrans

www.cngvehicle.com

WALK-IN- VAN: 10000 to 16000 gvwr



Refuse Trucks

Mack LNG Refuse Hauler with E7G engine



NATURAL GAS SERIES

The Mack® E7G natural gas engine is proof that the leading contractors to lead the industry in the installation of innovative vehicles for the future.

Offered in two power ratings, 225 hp and 230 hp, it features lower noise and emission levels, while providing the same excellent performance, sophistication and reliability that has made Mack the first choice for urban construction and municipal applications.

The Mack E7G engine series has been designed for heavy-duty truck and stationary set applications.



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For product information and availability, contact your nearest Mack Trucks, Inc. dealer or call 1-800-922-MACK.



Refuse Trucks

Crane Carrier
CNG Refuse Hauler
Cummins
Caterpillar
DDC



Refuse Trucks

Peterbilt 320/330/357
Dual Fuel Refuse Haulers
(NGVC)



Refuse Trucks

CNG Refuse with
Deere Engine
(under development)



City/Regional Delivery Trucks

Freightliner

Business Class FL70, FL80, FL112, FLD 120

Century Class C112, C120

Caterpillar Dual-Fuel

Cummins Dedicated
(NGVC)



City/Regional Delivery Trucks

Kenworth T800 LNG

Cummins Dedicated



City/Regional Delivery Trucks

Western Star

Constellation Series 5964SS

Caterpillar dual-fuel

DDC or Cummins dedicated

(NGVC)



City/Regional Delivery Trucks

DDC S69G 400hp
dedicated engine





Summary

- NG Trucks are HERE NOW!
- They are evolving and improving
 - Increasing reliability
 - Decreasing emissions
 - Increasing choice of models
 - Increasing number of manufacturers
- The NGNGV Program will create the Next Generation vehicles with new technology that solves some of the problems encountered with the current set of vehicles.

What Technologies??





What we learned from YOU and others

What incentives will customers need to adopt new vehicles?

CNG #1 answer: Low life-cycle **cost** (38)

LNG #1 answer: Tax credits (32)

What will be the key performance specifications for these vehicles?

#1 answer: **cost** (50)

What engine performance features will be important to customers of NGVs in 2004?

#1 answer: Lower **cost** (31)



What we learned from YOU and others

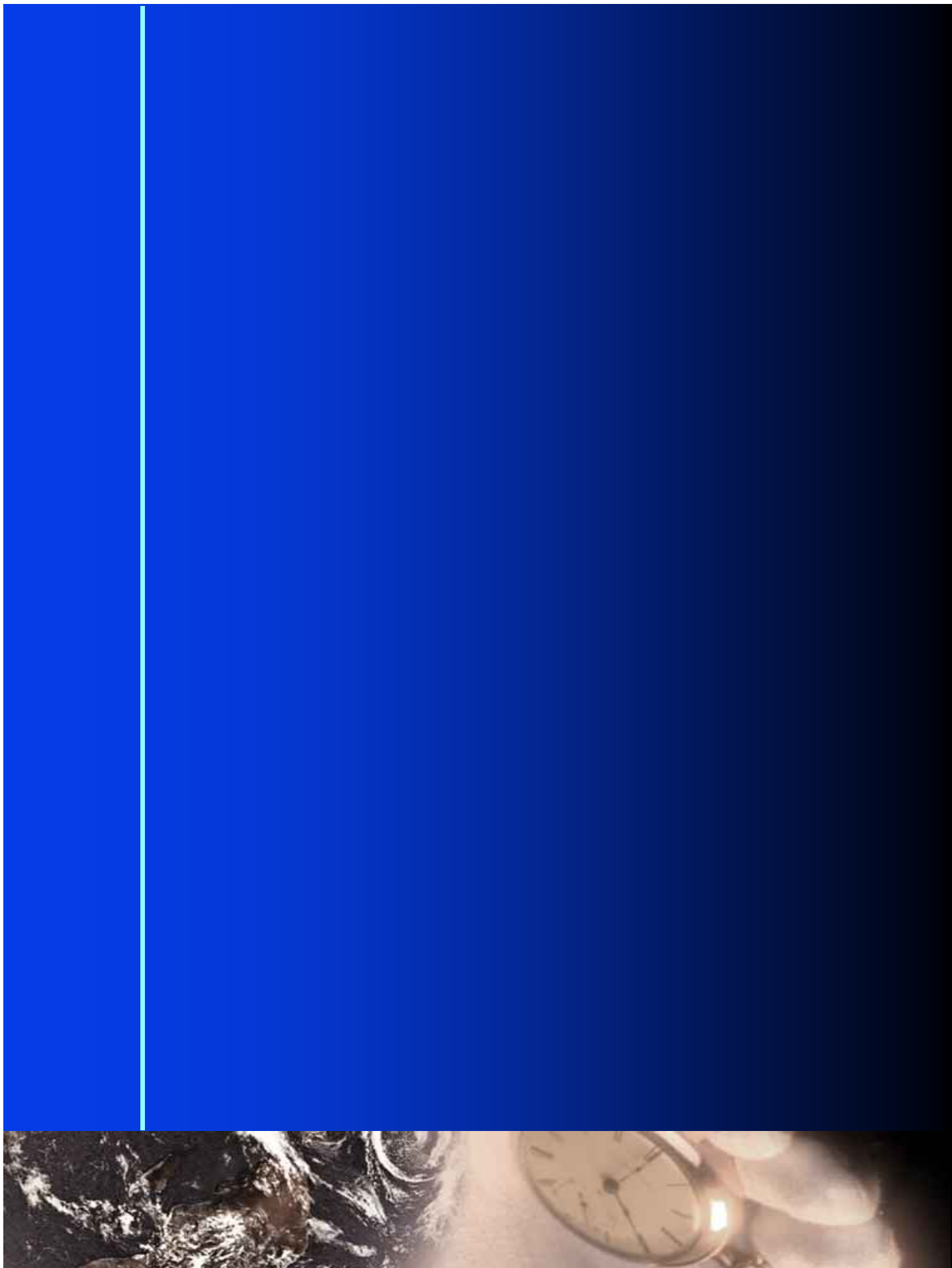
What fuel system and storage features will be important to CNG Vehicles in 2004?

#2 answer: Lower **cost** containers (21)

What fuel system and storage features will be important to LNG Vehicles in 2004?

#3 answer: Low **cost** tanks (14)

Lower Cost!!!





Meeting Agenda

✓ Welcome, Introduction and Objectives Paul Norton

Overview of Data from NGNGV Meetings Denny Stephens

Analysis of Data and Round 1 RFP Recommendations

Presentation Paul Norton and
Denny Stephens

Discussion All

Decision Process All



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All

Decision Process

All